2022 Second Quarter Compliance Monitoring
&
Operational Performance Report

Reporting Period April 1 – June 30, 2022

Port Hope Conversion Facility
Operating Licence
FFOL-3631.00/2027

One Eldorado Place
Port Hope, Ontario
L1A 3A1

Submitted to:
The Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
280 Slater Street
Ottawa, Ontario
K1P 5S9

Submitted On: August 23, 2022

I Executive Summary

Cameco Corporation (Cameco) is committed to the safe, clean, and reliable operation of all its facilities and continually strives to improve its performance and processes to ensure the safety of both its employees and local residents. The Port Hope Conversion Facility (PHCF) maintains the required programs, plans and procedures in the areas of health and safety, radiation protection, environment, emergency response, fire protection, waste management, and training.

As a result of these programs, plans and procedures, PHCF's operations have maintained radiation exposures to workers and the public well below the regulatory dose limits. Environmental emissions are also being controlled to levels that are a fraction of the regulatory limits.

Cameco utilizes administrative levels and action levels to provide early detection of issues and ensure levels remain well below regulatory limits. A variety of control measures and practices are employed as part of site programs to ensure the protection of the public, site employees and the environment. A robust ALARA program is in place to ensure continual improvement and to ensure exposures and emissions remain well below action levels.

II Table of Contents

1.0 Second Quarter Overview

1.1 Facility Operation

Cameco continues to strive for operational excellence at all its facilities through consistent application of management systems to ensure that they operate in a safe, clean, and reliable manner. Corporate policies and programs, including that for Safety, Health, Environment and Quality (SHEQ) provide guidance and direction for all site-based programs and procedures that define the PHCF Quality Management System.

There were no significant changes to Structure, Systems and Components (SSC) or processes in the second quarter of 2022.

The June 21, 2022 daily composite sample uranium result from the combined facility sanitary sewer discharge was reported above the daily action level of 100 µg U/L at a concentration of 280 µg/L. Underground utility deficiencies and associated groundwater infiltration conditions were the interpreted causal factors.

On June 28, 2022, the daily average for the UF6 main plant stack exceeded the action level of 40 gU/h at a value of 45 gU/h. The elevated result was investigated, and corrective actions are being tracked.

The UF6 plant ran uninterrupted for the second quarter of 2022. The UF6 plant will shut down in July for the summer maintenance outage period and will restart in August.

The UO2 plant ran uninterrupted for the second quarter of 2022. The UO2 plant will shut down in July for an extended period with a restart scheduled for September.

1.2 Physical Design / Facility Modification

There were no modifications affecting the safety analysis of the licensed facility made in the quarter that required written approval of the Commission or a person authorized by the Commission.

As part of the Vision in Motion (VIM) project, the site's liquid Hydrogen tank is being replaced by a new installation located at the south end of the facility. Commissioning of the new tank is planned for some time in 2022. A section of the PHCF Safety Analysis Report was updated to reflect this change and has been approved by CNSC staff.

At the PHCF, changes to the physical design of equipment, processes, and the facility with the potential to impact safety are evaluated using the internal design change process described in *Process and Design Change Control, CQP-113*. Changes are reviewed through Cameco's management of change workflow, which ensures all potential impacts to the environment as well as to the health and safety of personnel are evaluated prior to implementation.

2.0 Radiation Protection

This safety and control area covers the implementation of a radiation protection program, in accordance with the *Radiation Protection Regulations*. This program must ensure that contamination and radiation doses are monitored and controlled. Cameco manages the radiation protection program using ALARA principles in order to ensure doses are maintained well below regulatory limits.

There were no radiation dose action level exceedances in the second quarter of 2022.

Whole Body Dose

Table 1 shows the whole-body dose summary results from the second quarter of 2022 for six work groups: UF_6 Plant; UO_2 Plant, Maintenance; Technical Support (including Nuclear Energy Worker (NEW) contractors), Corporate Technical Services (formerly named Major Projects); and Administration.

Table 1

Second Quarter 2022 Whole Body Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	93	0.11	0.00	1.03
UO_2 Plant	24	0.06	0.00	0.19
Maintenance	73	0.03	0.00	0.26
Technical Support [1]	426	0.02	0.00	1.10
Corporate Technical Services	35	0.02	0.00	0.32
Administration	84	0.00	0.00	0.01
Total (Max)	**700**	**0.03**	**0.00**	**1.10**
[1]Includes contractors (NEWs) Quarterly Action Level 2.0 mSv (NEWs)				

Table 2 shows the average, minimum and maximum quarterly individual external whole-body exposures for the second quarter of 2021 through to the second quarter of 2022. The average whole-body dose is consistent with previous quarters when production was operational. The maximum whole-body dose received by a Material Handling operator was related to work in the warehouse area.

Table 2

Whole Body Dose Results by Quarter				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q2 2021	571	0.06	0.00	1.69
Q3 2021	686	0.05	0.00	0.82
Q4 2021	652	0.08	0.00	2.32
Q1 2022	615	0.06	0.00	1.68
Q2 2022	700	0.03	0.00	1.10
Quarterly Action Level 2.0 mSv (NEWs)				

Skin Dose

Table 3 shows the quarterly skin dose summary results for six work groups: UF_6 Plant; UO_2 Plant; Maintenance; Technical Support (including NEW contractors), Corporate Technical Services (formerly named Major Projects); and Administration. The highest exposures are from the UF_6 related to work in the flame reactor and effluent areas.

Table 3

Second Quarter 2022 Skin Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	93	0.51	0.00	5.89
UO_2 Plant	24	0.21	0.00	1.01
Maintenance	73	0.29	0.00	1.57
Technical Support[1]	426	0.07	0.00	1.99
Corporate Technical Services	35	0.02	0.00	0.33
Administration	84	0.00	0.00	0.01
Total (Max)	**700**	**0.15**	**0.00**	**5.89**
[1]Includes contractors (NEWs) Quarterly Action Level 15.0 mSv (NEWs)				

Table 4 shows the average and maximum quarterly individual skin exposure for the second quarter of 2021 through to the second quarter of 2022. The average skin dose is consistent with previous quarters when production was operational.

Table 4

Skin Dose Results by Quarter				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q2 2021	571	0.22	0.00	4.76
Q3 2021	686	0.21	0.00	5.39
Q4 2021	652	0.29	0.00	10.44
Q1 2022	615	0.25	0.00	5.88
Q2 2022	700	0.15	0.00	5.89
Quarterly Action Level 15.0 mSv (NEWs)				

Eye Dose

Table 5 shows the quarterly eye dose summary results for six work groups: UF_6 Plant; UO_2 Plant; Maintenance; Technical Support (including NEW contractors), Corporate Technical Services (formerly named Major Projects); and Administration. The highest exposure is from the UF_6 group related to work in the flame reactor and effluent areas.

Table 5

Second Quarter 2022 Eye Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	93	0.30	0.00	3.16
UO_2 Plant	24	0.14	0.00	0.60
Maintenance	73	0.16	0.00	0.80
Technical Support[1]	426	0.04	0.00	1.16
Corporate Technical Services	35	0.02	0.00	0.33
Administration	84	0.00	0.00	0.01
Total (Max)	**700**	**0.09**	**0.00**	**3.16**
[1]Includes contractors (NEWs)				

Table 6 shows the average, minimum and maximum quarterly individual external eye exposures for the second quarter of 2022.

Table 6

Eye Dose Results by Quarter*				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q1 2022	615	0.15	0.00	2.58
Q2 2022	700	0.09	0.00	3.16

*Note – Tracking eye dose results is a new requirement and additional quarters will be added to this table in future reports.

Urine Analysis

The urine analysis action levels are presented in Table 7 below.

Table 7

Urine Analysis Action Levels		
Parameter		**Action Level**
Urinalysis (NEW)	Weekly - UO_2/UF_6 Operators, Maintenance, Technical Support	65 µg U/L
	Monthly - Administrative Support	25 µg U/L
	Long-term Contractors	65 µg U/L
	Short-term Contractors	80 µg U/L
	Chemical toxicity – post shift sample	500 µg U/L
	Fluoride toxicity – all samples	7 mg F/L
Urinalysis (Non-NEW)	Daily - Routine Sample	40 µg U/L
	Monthly - Routine Sample	25 µg U/L
	Chemical Toxicity - Post Shift Sample	500 µg U/L
	Fluoride Toxicity – All Samples	4 mg F/L

There were no fluoride in urine results above the action level of 7 mg F/L in the second quarter of 2022.

Table 8 shows the distribution of urine results for the second quarter of 2022. A total of 10,878 urine samples were collected and analyzed for uranium during the second quarter of 2022. The majority of routine urine analysis results (98.5%) were less than 5 µg U/L in the quarter.

All results above 13 µg U/L were screened by radiation protection staff. There were no official investigations for uranium in urine during the second quarter of 2022.

Table 8

Second Quarter 2022 Routine Urine Analysis Results	
Distribution of Results	**Q2 2022**
Number of Samples < 5 µg U/L	10,719
Number of Samples > 5 to < 25 µg U/L	146
Number of Samples > 25 to < 50 µg U/L	10
Number of Samples > 50 µg U/L	3
Number of Samples Analyzed (Uranium)	10,878

Table 9 presents the internal urine analysis doses for the last five quarters. The average and maximum internal urine analysis doses in the quarter were 0.01 mSv and 0.16 mSv, respectively, which was consistent with previous quarters.

Table 9

Internal Dose (Urine) by Quarter				
Quarter	**Number of Individuals**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**	**Average Dose (mSv)**
Q2 2021	453	0.00	0.19	0.01
Q3 2021	527	0.00	0.28	0.01
Q4 2021	539	0.00	0.15	0.01
Q1 2022	493	0.00	0.26	0.01
Q2 2022	586	0.00	0.16	0.01

Fluoride in Urine

A total of 7,006 urine samples were analyzed for fluoride during the second quarter, with summary results provided in Table 10.

There were seven samples above the internal administrative investigation level of 4 mg F/L during the second quarter. The samples were investigated and entered into CIRS.

Table 10

Second Quarter 2022 Fluoride in Urine Analysis Results			
Type of Fluoride Samples	**Number of Samples**	**Minimum Concentration (mg F/L)**	**Maximum Concentration (mg F/L)**
All fluoride samples	7,006	0.1	6.7
Routine post-shift fluoride samples >= 7 mg F/L	0	-	-
Routine post-shift fluoride samples >= 4 mg F/L	2	-	-
Non-routine fluoride samples	363	0.1	3.4
Samples analyzed for U, insufficient volume (< 30mL) for F analysis	33	-	-

Lung Counting

The lung count trailer was at the BRR and the PHCF sites in the second quarter. At PHCF, the annual PHCF group and Cameco Fuel Manufacturing (CFM) employees were lung counted.

Contamination Control

The PHCF is divided into three zones for contamination control purposes. Zone 1 areas (clean areas - no radioactive sources other than monitoring equipment) are clearly delineated. Whole body monitors are located at the Zone 1 boundary in the main lobby, men's, and women's change rooms. There is also a monitor located at the gate 12 vehicle port. In Zone 2 areas and the yard Zone 3 areas (transition areas – may contain limited amounts of uranium compounds), no visible contamination should exist and, when detected, loose contamination is promptly isolated, monitored, cleaned, and monitored again to ensure the contamination has been removed. Zone 3 production areas are production areas where uranium compounds are expected. Incidents of zone contamination are presented in Table 11.

Table 11

Second Quarter 2022 Alpha Contamination Monitoring Results			
Area	**Number of Samples Taken**	**Zone Contamination Criteria (Bq/cm²)**	**Number of Samples Above Criteria**
Zone 1	670	0.4	0
Zone 2	11,435	0.4	36
Zone 3 (Yard)*	3	0.4	3

*Note – Samples are not routinely required in the yard area. Samples are taken as required if contamination is suspected.

The contamination in Zone 2 areas was primarily detected in the office areas and lunchrooms of production buildings. Contamination measurements are taken upon request in Zone 3 areas when contamination is suspected and only documented when above the applicable levels.

Additional monitoring has been put in place due to Covid-19 protocols. Specific conference and meeting rooms have been temporarily established as lunchrooms in response to the need of physical distancing during break times.

In-Plant Air

Routine air sampling is performed by collecting airborne particulate on air sampling filters and quantifying the airborne concentration of uranium. The second quarter results are presented in Table 12.

The site administrative level and derived air concentration (DAC), based on slow moving (low solubility) material, is 100 µg U/m^3 but protective measures, such as investigation and respiratory protection, are normally required as a precaution at lower DAC levels. Continuous air monitoring equipment (iCAMs) in the UF_6 and UO_2 plants are also used to provide early warning and to prompt response to elevated airborne uranium concentrations. Local alarms and direct communication with the control rooms provide early warning to plant personnel.

Table 12

Second Quarter 2022 In-Plant Air Uranium Concentration by Operations Group				
Operations Group	**Number of Samples Taken**	**Average (µg U/m^3)**	**Maximum (µg U/m^3)**	**Number of Samples Taken Above Administrative Level**
UF_6 Plant	4,283	8	455	27
UO_2 Plant	1,318	2	35	0
Waste Recovery	629	2	13	0
CUP	371	1	14	0

The maximum in-plant air sample of 455 µg U/m^3 was recorded on May 12, 2022, in the UF_6 plant. This result was due to a small release in the Ash-can area. The area was posted as respirator required.

The average in-plant air concentrations are consistent with previous quarters.

3.0 Conventional Health and Safety

This safety and control area covers the implementation of a program to manage non-radiological workplace safety hazards and to protect personnel and equipment. Conventional safety statistics are presented in Table 13.

Table 13

2022 Safety Statistics					
Quarter / Parameter	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**YTD**
First Aid Injuries	9	16	-	-	25
Medical Diagnostic Procedures	0	1	-	-	1
Medical Treatment Injuries	1	1	-	-	2
Other Recordable Injuries	0	0	-	-	0
Lost Time Injuries	0	0	-	-	0
Lost Time Injury Frequency	0	0	-	-	0
Lost Time Injury Severity	0	0	-	-	0

There were no lost time incidents that occurred in the second quarter.

Health and Safety Activities

- **Communications**: COVID Protective Measures were reviewed and adjusted based on government health recommendations. OHS and CSSC continued to issue safety bulletins to promote a focus on continuing safety awareness.
- **Education and Training**: Internal training remained in place as room occupancy levels returned to normal in June. ERT training schedule adjusted for 2022 with some taking place in spring and fall this year.
- **Safety Awareness Activities**: A "Caught Working Safely" activity was executed in the second quarter. Employees are able to recognize each other for safe working activities and enter to win a variety of prizes.
- **CSSC and Safety Subcommittees:** The CSSC committee continues to meet for regulatory meetings. Safety subcommittees continue to remain on hold, pending a refresher activity with Milliken.

- **Safety & Industrial Hygiene**: Fluorine monitoring improvements continue to be executed with a 2022 goal to complete a site assessment. Powered air purifying respirators (PAPR) have been sourced and are now being procured to replace the current fleet for site welders and Clean Up (CUP) crew.
- **COVID Interruption**: COVID vaccination requirements remain in effect to access PHCF in addition to public health protocol changes. As well, weekly rapid testing is still being offered.
- **Total Recordable Injury Rate (TRIR)** – Q2 Ending = 0.93 (16 First Aids, 1 medical diagnostic). Site has more than 3 million hours without an LTA. Contractor TRIR is 0.

4.0 Environmental Protection

This safety and control area covers the programs that monitor and control all releases of nuclear and hazardous substances into the environment, as well as their effects on the environment, as the result of licensed activities.

Public Dose

ORL equations for Site 1 and Site 2 have been derived and are expressed in the form shown below.

Public Dose = Dose $_{Air}$ + Dose $_{Water}$ + Dose $_{Gamma}$ < 0.3 mSv/y

The monthly dose from Site 1 and Site 2 are based on monitoring results for each dose component as shown in Table 14.

Table 14

Quarterly Dose (mSv/quarter)					
ORL Component	**Q1 2022**	**Q2 2022**	**Q3 2022**	**Q4 2022**	**YTD 2022**
Air	<0.001	<0.001	-	-	<0.001
Water	<0.001	<0.001	-	-	<0.001
Gamma – Site 1	0.023	0.020	-	-	0.043
Gamma – Site 2	0.030	0.029	-	-	0.059
Quarterly Dose – Site 1	0.023	0.021	-	-	0.044
Quarterly Dose – Site 2	0.030	0.029	-	-	0.059

Gamma Monitoring

As per the 2016 ORL, dose to the public is calculated for both site 1 and 2 using specific gamma fenceline monitoring locations. The results at station 2 are used for site 1 public dose calculations and the results at station 21 are used for site 2 public dose calculations. The results at these locations for this quarter are summarized and compared with regulatory action levels in Table 15.

There were no monthly gamma radiation action levels exceeded during the second quarter.

Table 15

Second Quarter 2022 Public Dose Gamma Monitoring Results					
Station Number	**April**	**May**	**June**	**Action Level (µSv/h)**	**Licence Limit (µSv/h)**
2	0.22	0.27	0.25	0.480	0.570
10	0.06	0.07	0.08	0.480	0.610
21	0.09	0.10	0.12	0.330	0.260

Air Emissions

The quarterly average and maximum stack emissions from the UF_6 plant main stack and the UO_2 plant main stack are presented in Table 16.

A stack monitoring program is used to determine the airborne uranium emission rates on a daily basis from the main stacks of the UF_6 and UO_2 plants.

One action level was exceeded for uranium emissions from the UF_6 plant main stack in the quarter. The elevated result was related to maintenance work. An investigation was completed, and corrective actions tracked through CIRS (PHCF-2022-000826).

No licensed action levels were exceeded for uranium emissions from the UO_2 plant main stack in the quarter. The UO_2 main stack average uranium emission rate was consistent with previous quarters during which production was operational.

Fluoride emissions from the UF_6 main stack are sampled and analyzed on a continuous basis using an on-line analyzer and the data is collected on the plant computer system. No licensed action levels were exceeded for fluoride emissions from the UF_6 plant main stack in the quarter. The UF_6 main stack average fluoride emission rate was consistent with previous quarters in which production was operational.

The UO_2 main stack is also continuously sampled for ammonia. No licensed action levels were exceeded for ammonia emissions from the UO_2 plant main stack in the quarter. The UO_2 main stack average ammonia emission rate was consistent with previous quarters.

Table 16

Daily Main Stack Emissions by Quarter									
Plant	**Parameter**	**Licence Limit**	**Action Level**	**Value**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
UF_6	Uranium g U/h	280	40	Quarterly Daily Average	2.6	1.4	2.1	2.3	3.8
				Quarterly Daily Maximum	4.7	6.3	6.7	6.7	44.7
	Hydrogen Fluoride g HF/h	650	230	Quarterly Daily Average	27	27	35	22	25
				Quarterly Daily Maximum	88	155	191	98	124
UO_2	Uranium g U/h	240	10	Quarterly Daily Average	0.4	0.3	0.5	0.5	0.6
				Quarterly Daily Maximum	2.3	0.6	1.1	0.9	1.2
	Ammonia kg NH_3/h	58	10	Quarterly Daily Average	2.2	1.0	2.2	2.9	2.6
				Quarterly Daily Maximum	5.1	2.9	4.2	7.7	4.9

Liquid Discharges

Production facility cooling water return quality data is summarized in Table 17 and Table 18.

As the PHCF operates a once-through non-contact cooling water system, harbour water supply quality influences cooling water return quality under normal operating conditions. Ambient water quality can fluctuate based on near-shore Lake Ontario currents, seasonal weather patterns, harbour remedial work and outer harbour sedimentation among other items.

General decreases in first quarter average and maximum uranium concentrations were recorded relative to the fourth quarter of 2021. A general decrease in uranium trending was noted from December 2021 through to February 2021 in relation to the interruption of Canadian Nuclear Laboratories (CNL) remedial work within the inner Port Hope harbour over the winter period. Following resumption of inner harbour dredge activities

in March 2022, a corresponding increase in uranium trending was observed. Elevated mean and maximum conditions remained through the second quarter as a function of on-going inner harbour dredge work. The second quarter maximum monthly mean and daily conditions were recorded in May. Similar trending patterns have been recorded at the PHCF harbour water intake.

An elevated first quarter maximum fluoride result was recorded for the UF_6 plant cooling water return (UO2N) relative to typical baseline concentrations and harbour water intake trending in association with harbour water supply challenges and a brief harbour water intake outage in February. UO2N cooling water return fluoride trending otherwise aligned with corresponding cooling water intake trending in the second quarter.

Ammonia results continue to be primarily influenced by the revised method detection limit implemented in the first quarter of 2020.

Table 17

UO2N Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
Uranium	µg U/L	Average	5.4	21	230	48	80
		Maximum	12	89	520	140	280
Fluoride	mg F/L	Average	0.069	0.070	0.070	0.13	0.11
		Maximum	0.10	0.10	0.17	0.76	0.21
Ammonia & Ammonium	mg N/L	Average	0.014	0.023	0.014	0.014	0.014
		Maximum	0.014	0.32	0.014	0.014	0.014
Nitrate	mg N/L	Average	0.80	0.52	1.2	1.2	0.68
		Maximum	1.6	1.2	1.9	1.7	1.7
pH	-	Minimum	8.14	8.04	8.12	8.02	8.12
		Maximum	8.40	8.39	8.36	8.36	8.38

Table 18

UO2S Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
Uranium	µg U/L	Average	5.8	24	240	53	85
		Maximum	14	94	540	160	320
Ammonia & Ammonium	mg N/L	Average	0.014	0.014	0.014	0.014	0.014
		Maximum	0.014	0.014	0.049	0.014	0.014
Nitrate	mg N/L	Average	0.84	0.60	1.4	1.2	0.71
		Maximum	1.6	1.3	2.0	1.8	1.3
pH	-	Minimum	8.21	8.14	8.17	8.00	8.18
		Maximum	8.44	8.48	8.38	8.40	8.45

A daily sanitary sewer discharge uranium action level of 100 µg U/L (0.10 mg U/L) and a monthly mean release limit of 275 µg U/L (0.275 mg U/L) are currently in place. Tables 19 and 20 summarize uranium concentrations and pH values recorded for the second quarter of 2022.

The daily sanitary sewer action level was reached one time and exceeded one time in the second quarter. Sanitary sewer discharges otherwise remained well below the facility monthly mean release limit throughout the second quarter.

Underground utility deficiencies and associated groundwater infiltration conditions were the interpreted causal factors for the elevated uranium in sewage recordings. Groundwater infiltration potential influences include Lake Ontario water level conditions and the significance and frequency of wet events.

Cameco completed sanitary sewer infrastructure inspections in targeted areas in the fourth quarter of 2021, both within and upstream of the licensed facility, to identify utility deficiencies of concern and potential areas of groundwater infiltration. Follow-up inspections were initiated in the first quarter of 2022 and Cameco continues to evaluate potential sanitary sewer infrastructure rehabilitation, replacement and/or abandonment opportunities, taking into consideration work completed to date and planned site and VIM project sanitary sewer system improvements.

Specific to the licensed facility, Cameco is currently evaluating the replacement and realignment of sewer infrastructure servicing existing facility lift stations and portions of Building 20. Moreover, target areas have been selected for rehabilitation or abandonment

planning. Some rehabilitation work considerations extend to Marsh Street municipal infrastructure.

Table 19

Sanitary Sewer Discharge Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
Uranium	mg U/L	Average	0.016	0.016	0.050	0.044	0.050
		Maximum	0.047	0.056	0.25	0.14	0.28
pH	-	Minimum	7.38	7.14	6.94	7.18	7.32
		Maximum	8.27	8.56	8.31	8.31	8.20

Table 20

Q2 2022 Monthly Sanitary Sewer Discharges			
Period	**Sanitary Sewer Action Level/Release Limit**	**Monthly Average Uranium Concentration (µg U/L)**	**Daily Maximum Uranium Concentration (µg U/L)**
April	Action Level of 100 µg U/L – daily composite samples Release Limit of 275 µg U/L – monthly average of daily composite samples	67	100
May		47	78
June		37	280

Ambient Air Monitoring

Table 21 shows the quarterly all-station average and maximum uranium dustfall results from the second quarter of 2021 through to the second quarter of 2022.

No uranium dustfall results exceeded the internal administrative screening level in the second quarter. The average uranium in dustfall results in the second quarter of 2022 were consistent with the uranium in dustfall averages during the previous quarters.

Table 21

Uranium in Dustfall Results by Quarter (mg U/m^2/30 days)					
Value	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
Average	<0.1	0.1	0.1	<0.1	0.1
Maximum	0.1	0.2	0.6	0.1	0.4
Internal Administrative Screening Level = 10 mg U/m^2/30 days					

Table 22 summarizes the average and maximum uranium hi-vol results from the second quarter of 2021 through to the second quarter of 2022.

Average and maximum results for the quarter are below regulatory criteria. The average results for the Marsh Street, Waterworks, Hayward Street and Shuter Street stations are comparable to levels observed in the previous quarters.

Table 22

Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg U in TSP/m^3)					
Quarter	**Result**	**Waterworks**	**Shuter Substation**	**Marsh Street**	**Hayward Street**
Q2 2021	Average	0.002	0.001	0.004	0.002
	Maximum	0.025	0.004	0.071	0.007
Q3 2021	Average	0.001	0.001	0.004	0.002
	Maximum	0.009	0.005	0.021	0.010
Q4 2021	Average	0.001	0.001	0.002	0.002
	Maximum	0.020	0.011	0.017	0.011
Q1 2022	Average	0.001	0.001	0.003	0.002
	Maximum	0.017	0.014	0.018	0.014
Q2 2022	Average	0.002	0.002	0.004	0.003
	Maximum	0.012	0.036	0.031	0.012
Average <0.06 µg U in TSP/m^3 (annual) AAQC Maximum <0.3 µg U in TSP/m^3 (24 hr) AAQC					

Table 23 shows the quarterly all-station average and maximum fluoride dustfall results from the second quarter of 2021 through to the second quarter of 2022.

The average fluoride in dustfall results in the second quarter of 2022 was consistent with previous quarters during which production was operational.

Table 23

Fluoride in Dustfall Results by Quarter (mg F/m²/30 days)					
Value	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
Average	1.2	0.6	1.1	0.9	1.4
Maximum	8.3	4.7	11	10	9.9
Internal Administrative Screening Level = 20 mg F/m²/30 days					

Table 24 shows the average and maximum lime candle results from the second quarter of 2021 through to the second quarter of 2022. The average results are comparable to levels observed in the previous quarters.

Table 24

Monthly Lime Candle Results by Quarter (µg F/100 cm²/30 days)					
Value	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
Average	5	3	3	4	4
Maximum	13	11	7	11	12
The desirable ambient air quality criteria for lime candles are to protect forage crops consumed by livestock. During the summer growing season, the criteria is 40µg F/100cm²/30 days, changing to 80µg F/100cm²/30 days in winter					

Ambient Water Quality Monitoring

A summary of harbour water intake (SCI) water quality data is presented in Table 25. Consistent with the production facility returns trending, general decreases in first quarter average and maximum uranium concentrations were recorded relative to the fourth quarter 2021. A general decrease in uranium trending was noted from December 2021 through to February 2021 in relation to the interruption of CNL remedial work within the inner Port Hope harbour over the winter period. Following resumption of inner harbour dredge activities in March 2022, a corresponding increase in uranium trending was observed. Elevated mean and maximum conditions remained through the second quarter as a function of on-going inner harbour dredge work. The second quarter maximum monthly mean and daily conditions were recorded in May.

Ammonia results otherwise continue to be primarily influenced by the revised method detection limit implemented in the first quarter of 2020.

Table 25

SCI Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**	**Q2 2022**
Uranium	µg U/L	Average	5.7	22	240	52	85
		Maximum	12	92	540	160	280
Fluoride	mg F/L	Average	0.066	0.067	0.070	0.11	0.11
		Maximum	0.11	0.11	0.17	0.17	0.22
Ammonia & Ammonium	mg N/L	Average	0.014	0.017	0.014	0.014	0.014
		Maximum	0.014	0.17	0.014	0.014	0.014
Nitrate	mg N/L	Average	0.87	0.60	1.3	1.2	0.72
		Maximum	1.7	1.4	1.9	1.8	1.4
pH	-	Minimum	7.71	8.15	8.14	8.02	8.09
		Maximum	8.44	8.43	8.42	8.36	8.46

Cooling Water Intake – Visual Inspections

Table 26 below presents all non-conformities observed during daily visual inspections of the cooling water intake system.

Table 26

Date	**Quantity of Fish Observed**	**Observations**
April 13	1	1 small fish approximately two to three inches in length was observed on April 13 at the travelling screen sump. Because there were no breaches at the intake, it is believed that the small fish was washed into the pit during heavy wave action.
May 27 – June 3	1	1 small fish approximately two to three inches in length was observed daily during this time period at the travelling screen sump. Because there were no breaches at the intake, it is believed that the small fish was washed into the pit during heavy wave action and likely the same fish observed in April.
June 4 - 25	1 to 2	1 to 2 small fish approximately two to three inches in length, were observed 6 days during this time period at the travelling screen sump. Based on the common description, these observations are believed to be the same fish observed in late May through early June. It is believed that the small fish were washed into the pit during heavy wave action.

5.0 Public Information Program

During the second quarter of 2022, CFM continued to meet the requirements of CNSC RD/GD 3.2.1, Public Information and Disclosure programs.

Public Engagement

Cameco sponsored the Float Your Fanny Down the Ganny event in Port Hope April 9 and the Handbags for Hospice event on April 21.

From April 12 to 14, Cameco representatives attended the Canadian Nuclear Association Conference in Ottawa. The Cameco booth featured the video from How It's Made, a replica fuel bundle and fact sheets. Representatives engaged with students and other conference attendees.

Cameco welcomed Members of Parliament Benjamin T Lobb, MP Huron-Bruce, Corey Tochor, MP Saskatoon-University and Larry Maguire, MP Brandon-Souris to tour the Port Hope Conversion Facility and Cameco Fuel Manufacturing on May 27.

The spring issue of Energize was mailed to all addresses in Port Hope and posted on the Cameco website on May 30. The issue featured stories on the CFM licence renewal process, quick facts about CFM Port Hope, the benefits of nuclear, and Cameco in the community.

Cameco was a hole sponsor for the Northumberland Sunrise Rotary Golf Tournament on May 30.

Cameco employees took part in the Northumberland United Way Day of Caring on June 10 and sponsored the Trent Hills Pride Festival from June 20 to 26. Cameco sponsored the Gil Jurchison Scholarship for chemistry and physics at the Port Hope High School.

On June 29, a news release was issued to local media announce the Cameco Charity Golf Tournament to be held on September 9. The tournament raises funds for the Cameco Fund for Mental Health, which supports mental health programs in Northumberland County.

Cameco provided free advertising to local charitable organizations with its sponsorship of MyFMs Community Partner Program. Through the quarter, Habitat for Humanity Northumberland, La Jeunesse Youth Orchestra and Cultivate Festival benefitted from this sponsorship by receiving advertising.

Public Disclosure

PHCF made two public disclosures during the second quarter: Environment & Safety - Conversion: Port Hope - Fuel Services - Businesses - Cameco

Posting Date	June 27, 2022
Incident Date	June 21, 2022
Incident	Environmental Action Level Exceedance on June 21, 2022
Details	The daily sanitary sewer discharge recorded a value of 280 µg/L on June 21, 2022, which exceed the uranium sanitary sewer action level of 100 µg/L. Facility discharge was otherwise well below the sanitary sewer uranium limit of 275 µg/L (monthly average) during the month of June. There was no health or safety risk posed to the public, workers or the environment.
Corrective Action	Groundwater infiltration is the likely cause. Cameco notified the Canadian Nuclear Safety Commission and the Municipality of Port Hope.
Cameco Environmental Effect Rating	1

Posting Date	June 30, 2022
Incident Date	June 28, 2022
Incident	Environmental Action Level Exceedance on June 28, 2022
Details	The daily average for the UF_6 main plant stack recorded a value of 45 gU/h on June 28, 2022, which exceeds the action level of 40 gU/h. Facility emissions remained well below the regulatory limit of 280 gU/h. There was no health or safety risk posed to the public, workers or the environment.
Corrective Action	The UF_6 plant was safely shutdown, and an investigation was initiated. The suspected cause is maintenance work that occurred on June 28, 2022. Cameco notified the Canadian Nuclear Safety Commission.
Cameco Environmental Effect Rating	1

Social Media

Cameco Ontario's Facebook community grew by 22 new followers (1,073 total) and had a total of 1,006 page likes at the end of the quarter. Cameco Ontario's 23 posts covered information such as:

- Shared job opportunities available at Cameco for summer students and full-time positions
- Recognized Earth Day on April 22
- Various community sponsorships and partnerships
- Shared a photo of the Cameco booth at the Canadian Nuclear Association conference 2022 in Ottawa
- Shared a photo from a tour of PHCF of Members of Parliament
- Promoted the spring issue of Energize
- Cameco hosted the technical tour for the World Nuclear Fuel Market conference on June 8

- Cameco employees in Port Hope and Cobourg took part in the annual Northumberland United Way Day of Caring on June 10
- Recognized National Indigenous Peoples Day on June 21 by sharing profiles of various employees from around Cameco
- Promoted the Cameco Charity Golf Tournament, raising money for the Cameco Fund for Mental Health

By the end of the quarter, the Instagram account had grown by 11 new followers for a total of 691 followers. Photos and information featured were similar to the Cameco Facebook page.

Indigenous Engagement

Members of Anishinabek Nation toured the Port Hope Conversion Facility and Cameco Fuel Manufacturing on May 24. The guests included the Anishinabek Nation Grand Council Chief, Northern Superior Regional Deputy Grand Council Chief (Biinjitiwaabik Zaaging Anishinaabek), Southeast Regional Deputy Grand Council Chief (Alderville First Nation), Southwest Regional Deputy Grand Council Chief (Chippewas of the Thames First Nation) and Curve Lake First Nation. The tours were provided by Cameco leadership and included overview presentations of each operation, and opportunities for questions and dialogue.

Cameco's communications manager and director of regulatory compliance and licensing met with Scugog Island First Nation on May 13, 2022. This meeting was part of Cameco and Scugog Island's regularly scheduled update meetings. The meeting focused on the CFM licence renewal with focus on what Cameco is asking for in the licence (20 years and production increase).

Cameco's communications manager and director of regulatory compliance and licensing projects met with Curve Lake First Nation on April 1 and April 27 as part of regularly scheduled updates. The April 1 meeting focused on the CFM licence renewal with focus on what Cameco is asking for in the licence (20 years and production increase). The April 27 meeting focused on environmental data specific to the CFM licence renewal. Cameco shared emissions data for the increased production scenario (noting there is no planned increase). Curve Lake asked for a refresher on soil and what the mitigation measures are already in place that protect the environment.

Public disclosures are reviewed and discussed at all meetings with Curve Lake and Scugog Island.

On April 7, Cameco emailed the 2021 Q4 Compliance Report and 2021 Annual Compliance Report to Curve Lake, Scugog Island, Alderville, Hiawatha and Rama First Nations and the Mohawks of the Bay of Quinte.

On June 29, Cameco emailed the Q1 2022 Compliance Report and Spring Issue of Energize to Curve Lake, Scugog Island, Alderville, Hiawatha and Rama First Nations and the Mohawks of the Bay of Quinte.

Website

Energize: The spring issue of Energize was posted to the website: Energize - Spring 2022 - Making a Difference - Community - Cameco Fuel Services

Stories featured in the issue included:

- CFM licence renewal process
- Quick facts about CFM Port Hope
- The benefits of nuclear
- Cameco in the community.

News Release: A news release announcing the 2022 Cameco Charity Golf Tournament was posted to the website: The Cameco Charity Golf Tournament returns on September 9, 2022 - News Archive - Media - Cameco Fuel Services

Dedicated Page: A page dedicated to the golf tournament for information and registration was established: Step onto the Golf Course to Step Up for Mental Health - Making a Difference - Community - Cameco Fuel Services

Compliance Reports: The 2022 Q1 Compliance Report was posted to the website: Media Library - Media - Cameco Fuel Services

Public Disclosures: Two public disclosures were posted to the website: Environment & Safety - Conversion: Port Hope - Fuel Services - Businesses - Cameco

Media Analysis

Cameco received media coverage regarding Step Up for Mental Health and other community initiatives:

- **The Cameco Charity Golf Tournament Returns for 2022** – Today's Northumberland – June 30, 2022

- The Cameco Charity Golf Tournament Returns for 2022 - Today's Northumberland - Your Source For What's Happening Locally and Beyond (todaysnorthumberland.ca)

- **Cameco recognized for its ongoing support of student nutrition programs in Northumberland County** – Today's Northumberland – April 26, 2022

- Cameco Recognized for Its Ongoing Support of Student Nutrition Programs in Northumberland County - Today's Northumberland - Your Source For What's Happening Locally and Beyond (todaysnorthumberland.ca)

Communication Products

The spring 2022 issue of Energize was mailed to all addresses in Port Hope, posted to camecofuel.com and shared via social media channels. The issue featured stories on the CFM licence renewal process, quick facts about CFM Port Hope, the benefits of nuclear, and Cameco in the community.

- Energize - Spring 2022 - Making a Difference - Community - Cameco Fuel Services

A news release announcing the 2022 Cameco Charity Golf tournament was issued to local media, posted on the website and promoted on social media:

- The Cameco Charity Golf Tournament returns on September 9, 2022 - News Archive - Media - Cameco Fuel Services

6.0 Other Matters of Regulatory Interest

6.1 Vision in Motion

VIM engineering activities continued for site-wide infrastructure collaboration with the Municipality of Port Hope (MPH) on stormwater systems in the vicinity of Eldorado Place and the Cameco parking lot, building 72 (new warehouse), removal of equipment from Building 5B and the large excavation to be completed west of the turning basin.

On-site project activities continued from the previous quarter, including interior demolition activities at Building 27 where equipment removal was well progressed down to the 2nd floor, and contractor plans for demolition of the building structure were completed. Commissioning of the new hydrogen station continued to be in-progress but was impacted by liquid hydrogen supply issues and final inspections and audits by the vendor (Linde) and TSSA. Mobilization began for upgrades to the Dorset Street facility to support ongoing transfer of wastes to the LTWMF.

Packaged waste shipments at the LTWMF were put on hold by CNL early in the quarter pending resolution of a concern regarding placement of pallets in the waste cells at the LTWMF. Cameco is storing materials until shipments can resume. Delivery of materials in roll-off bins is still not permitted while the LTWMF evaluates safety measures for unloading these containers.

The MPH and Cameco completed the transfer of the south portion of the former waterworks property to MPH and completed the termination of the Choate St. construction agreement. A proposed agreement with the MPH for Cameco remediation of municipal properties is pending final approval.

The Supplementary Environmental Monitoring Plan for Vision in Motion and Other Clean-Up Program Projects is in place to monitor environmental impacts for the VIM activities, primarily during demolition/excavation. There were no environmental monitoring exceedances/reportable events that occurred in the second quarter related to VIM activities.

7.0 Concluding Remarks

Cameco is committed to the safe, clean, and reliable operations of all its facilities and continually strives to improve safety performance and processes to ensure the safety of both its employees and the people in neighbouring communities.

In the second quarter of 2022, PHCF did not exceed any CNSC regulatory limits. As a result of the effective programs, plans and procedures in place, the PHCF was able to maintain individual radiation exposures well below all regulatory dose limits. In addition, environmental emissions continued to be controlled to levels that are a fraction of the CNSC regulatory limits, and public radiation exposures are also well below the regulatory limits.

PHCF's ALARA program continued to be effective in the second quarter of 2022.

Cameco's relationship with local residents remains strong and we are committed to maintaining the strong support and trust we have developed over the past several years.